REMARKS

Claims 1-20 are pending and all stand rejected. Claims 3-7, 15 and 17-19 are amended hereby to more particularly point out and distinctly claim the invention, including providing a more proper antecedent basis for various claim terms. The substantive rejections based upon prior art are all respectfully traversed.

As a preliminary matter, the Examiner objects to claims 6 and 7 for informalities relating to features having a "volume" (claim 6) and for lacking the current variable, i, in the math integral (claim 7). By this response, the Applicant has added the variable i to the integral of claim 7 in accordance with the equation number 1 from the specification at page 15. No amendment is presented for claim 6, relative to the Examiner's objection, in consideration of the following remarks. The term "desired power per unit volume condition" relates, in one manner, to the variable "PV" according to equation 2 on page 16 of the specification and is proper as recited. In turn, power per unit volume relates to a condition shown, for example, in Figure 8. The structure having a "volume" corresponds to an "inkjet heater" having "a thickness and an area" as recited in independent claim 1, for example. In amended claim 3, the area corresponds to "a heater width and a heater length." The amendment of claim 3 provides a proper antecedent basis for the term "calculating" as opposed to the term "providing" which nowhere appears in any of claims 1 or 3.

The Examiner rejects claims 1-8, 12-16 and 20 as anticipated by Ikeda 4,567,493. According to the Examiner, Ikeda teaches an inkjet printhead with a thickness and area "selected to that a desired power consumption, and hence ink ejecting energy is obtained (col. 6:63-68). The ink ejecting energy produces a stable ink ejection (col. 2:42-46) at the desired energy range." *Page 2, Paragraph No. 3, Office Action 1-20-04.*

As taught by Ikeda at *col. 6, ll. 63-68*, the "film thickness of the heat generating resistive layer [207] is determined in accordance with an area and material thereof and a shape and a size of the heat applying portion and a power consumption so that a desired heat per hour may be generated. Usually, it is 0.001-5 μm and preferably 0.01-1 μm."

The Applicant does not disagree that inkjet printheads of the past have ejected ink in stable and unstable ink jetting energy ranges. The Applicant does not disagree that heaters of the prior art inherently or expressly have a specific material forming a thin film layer on a substrate and that such has a shape with some thickness and area. The Applicant does disagree, however, that any prior art inkjet heaters first had their thickness and area calculated and then a stable ink jetting energy range predicted based upon this calculated thickness and area. In other words, the prior art, especially Ikeda at *col. 6, ll. 63-68*, simply determines what their input or heater structure (e.g., film thickness, shape and area) should embody for a given output (e.g., desired heat per hour). Yet, in the reverse, they do not and cannot determine their given output based upon their input. Namely, they cannot determine what their desired heat per hour will be if all they know is their heater thickness, material, shape and/or area. That, however, is exactly what the inventors of the instant application can, in fact, predict or foretell. Namely, they can predict what the output (e.g., stable ink jetting range) will correspond to for a given heater structure input (e.g., thickness and area). Moreover, Ikeda, at best, merely teaches an output of "heat per hour" to be generated. In one aspect, heat per hour is, in units, British Thermal Units/60 minutes. In another aspect, it may be degrees/60 minutes. This, however, has nothing at all to do with stable ink jetting energy ranges, especially those taught with units of joules/m^3, and cannot anticipate nor be used in combination with other references in rejecting the pending claims.

For this reasoning, the Applicant submits the patentability of claims 1-8, 12-16 and 20. More particularly, the Applicant submits claim 1 as patentable over Ikeda because the method for "anticipating a stable operating range for an inkjet printhead" expressly claims "calculating a thickness and area of an inkjet heater" in the printhead and then "***predicting*** a stable ink jetting energy range for said heater ***based upon*** said thickness and area." (Emphasis added). Ikeda nowhere teaches this method.

In claim 2, the application further requires firing an inkjet heater at the predicted energy range. Nowhere does Ikeda teach "predicting" a stable ink jetting energy range, let alone firing an inkjet heater at such range, post-prediction. Thus, the Applicant asserts the patentability of this claim.

In claims 3-6, the application further requires "providing" additional variables in the method of "anticipating a stable operating range" of a printhead that cannot be found anywhere in the Ikeda reference relative to anticipating an operating range based upon the thickness and area of a heater in the printhead. As for the amendments in these claims, the antecedent reference to the term "calculating" (which relates to "calculating a thickness and an area" of an inkjet heater in claim 1) has been stricken in favor of merely "providing" these additional variables.

In claim 7, the step of predicting becomes further modified to recite a specific equation. Regarding the Examiner's contention that this equation is "analogous to Ohm's law," the Applicant respectfully states the claimed equation is an integration of current squared over time and that Ohm's law is an equation/relationship steadfastly constant over time. Thus, the Applicant can find no analogy between the two equations and asserts the patentability thereof.

Because of its similarity to claims 1 and 2, the Applicant asserts the patentability of claim 8 for the reasons already given.

In claim 13, the application requires predetermining the stable operating range of an inkjet heater by "predicting a stable ink jetting energy range for said inkjet heater" as "based upon a thickness and area of said inkjet heater." Again, Ikeda does not teach the ability to predict or foretell stable ink jetting energy ranges solely given a thickness and area of a heater. To the contrary, Ikeda starts with a given output of "heat per hour" and then figures its film thickness, area, material, shape and size. Of course, heat per hour does not anticipate ink jetting energy ranges. Claim 14 depends from 13 and further requires the step of calculating the thickness and area so that the step of predicting can be performed. But, since Ikeda cannot predict a stable ink jetting energy range output, it has no need to calculate thickness and area for this purpose.

In claim 15, a stably operating inkjet printhead becomes produced by foretelling a desired stable ink jetting energy range and then forming an inkjet heater having a thickness and area that corresponds to such range. As before, Ikeda cannot perform the step of foretelling or predicting.

Claim 16 further requires the forming of the printhead by depositing thin films on a substrate and the thickness thereof embodies "a thickness of an overcoat layer and a resistor layer." The width of the heater multiplied by the length corresponds to the area of claim 15. Ikeda does not make any of this known in its teaching.

By their direct or indirect dependence upon one of the previously described claims, the Applicant further submits the allowability of each of claims 9-11 and 17-19 rejected upon the combination of Ikeda and Prasad 6,309,052 or Ikeda and Shirato 4,392,907. The Applicant also asserts the combination of Ikeda with either of these references fails because they, like Ikeda, do not and cannot predict, foretell or otherwise predetermine a stable ink jetting energy range based upon a given input of a heater thickness and area.

The Applicant believes that all pending claims stand in a condition for allowance. If the Examiner disagrees, however, he is invited to contact the undersigned representative at the number listed below in order to reduce costs and expedite the issuance of this patent.

Respectfully submitted,

KING & SCHICKLI PLLC

Michael T. Sanderson
Registration No. 43,082

247 North Broadway
Lexington, Kentucky
(859) 252-0889

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